

REMARKS

This responds to the Office Action mailed on July 9, 2008.

Claims 1, 8, 18 and 27 are amended, no claims are canceled, and no claims are added; as a result, claims 1-52 are now pending in this application.

Telephonic Interview Summary

Applicant's representative, Benjamin Armitage, thanks Examiner Brian Talbot for the telephonic discussion on August 22, 2008, during which we discussed proposed amendments and the references cited in the present Office Action.

§103 Rejection of the Claims

1) Claims 1-4, 9-14, 19-23, 28-34 and 41-43 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilkinson et al. (U.S. Patent No. 5,252,410; hereinafter "Wilkinson") in combination with JP '291.

Applicants respectfully traverse the above rejection on the ground that no *prima facie* case of obviousness presently exists with respect to these claims. Not all elements of the claims are provided for in the cited references.

Claim 1

Currently amended claim 1 includes "forming a curable PFSI electrolyte comprising the steps of: mixing a perfluoro sulfonate ionomer (PFSI), a monomer and a cross linking agent having at least two vinyl functionalities, sufficient to form a mixture; removing a solvent of the PFSI by distillation to obtain a curable PFSI electrolyte." Neither the Wilkinson reference, nor the JP '291 reference, describe this element of claim 1. Page 3 of the Office Action admits that Wilkinson "fails to teach the claimed electrolyte composition including PFSI with a monomer and a cross-linking agent having at least two vinyl functionalities." The JP '291 is deficient in providing such a composition. The abstract of JP '291 discloses "impregnating a perfluorocarbon polymer membrane having sulfonic acid group with sulfone ring-forming diolefin monomers and polymerizing the monomers." Applicants find no mention of a divinyl

benzene crosslinking agent in the abstract of JP ‘291. Further, JP ‘291 discloses a perfluorocarbon (PFC) polymer having sulfonic acid groups, not a perfluorosulfonate ionomer (PFSI).

Currently amended claim 1 also includes “disposing the curable PFSI electrolyte on a first electrode and a second electrode forming a precursor; and treating the precursor to cure at least a portion of the curable PFSI electrolyte forming a cured electrolyte composition that has a different viscosity than the precursor.” Neither the Wilkinson reference, nor the JP ‘291 reference, describe this element of claim 1. Wilkinson describes a conventional fuel cell configuration in which a sheet ion exchange membrane is positioned between two electrodes (see Fig. 3). Wilkinson does not describe a method for disposing a curable PFSI electrolyte on a first and second electrode forming a precursor. The electrolyte membrane of Wilkinson is already formed and cured prior to positioning between the electrodes. The abstract of JP ‘291 describes impregnating a cured membrane and does not discuss disposing the curable PFSI electrolyte on a first electrode and a second electrode forming a precursor; and treating the precursor to cure at least a portion of the curable PFSI electrolyte forming a cured electrolyte composition that has a different viscosity than the precursor. The JP ‘291 does not describe a first and second electrode.

Claim 31

In addition to the arguments above, Claim 31 of the present invention includes “forming in a substrate a plurality of channels; disposing the curable PFSI electrolyte into the channels to form a precursor; and treating the precursor to cure at least a portion of the curable PFSI electrolyte forming a cured electrolyte composition.” Neither Wilkinson nor JP ‘291 describe forming in a substrate a plurality of channels. JP ‘291 does not disclose at least two channels of the electrochemical cell. The membrane electrode assembly of Wilkinson has integral reactant flow passages interposed between two separator layers. The membrane electrode assembly also includes an ion-exchange membrane interposed between an anode and cathode. The electrodes may include at least one optional groove formed in its surface facing away from membrane. The channels of Wilkinson do not interact or contact the electrolyte membrane, as they are positioned in the electrodes on an opposite side of the conventional electrolyte membrane (see Fig. 3).

Claim 41

In addition to the arguments above, Claim 41 of the present invention includes “depositing a plurality of electrodes on a substrate; depositing the curable electrolyte over the electrodes to form a precursor; and treating the precursor to cure at least a portion of the curable PFSI electrolyte forming a cured electrolyte composition. Neither Wilkinson, nor JP ‘291, discloses depositing a plurality of electrodes on a substrate.

All remaining rejected claims are dependent from independent claims 1, 31 and 41 and are believed to be in similarly allowable condition. Applicant respectfully requests removal of the obviousness rejection.

2) Claims 5, 15, 24, 38 and 47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilkinson in combination with JP ‘291 as applied above further in view of Singleton (U.S. Patent No. 5,425,687).

Applicant respectfully requests withdrawal of this rejection on the grounds discussed in (1) above because neither Singleton nor the accompanying reasoning in the Office Action appear to cure the deficiencies noted above in (1).

3) Claims 8, 18, 27, 36-37, and 45-46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilkinson in combination with JP ‘291 as applied to claim 1 above and further in view of Singleton and Kiefer (2005/0147859).

Applicant respectfully requests withdrawal of this rejection on the grounds discussed in (1) above because neither Singleton nor Kiefer nor the accompanying reasoning in the Office Action appear to cure the deficiencies noted above in (1).

4) Claims 6-7, 16-17, 25-26, 35, 39-40, 44 and 48-53 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilkinson in combination with JP ‘291, as applied above further in combination with Kang et al. (U.S. Patent No. 6,727,024).

Applicant respectfully requests withdrawal of this rejection on the grounds discussed in (1) above, because neither Kang, nor the accompanying reasoning in the Office Action appear to cure the deficiencies noted above in (1).

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at 612-373-6920 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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7/15/08

By

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CERTIFICATE UNDER 37 CFR 1.8. The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this *8th* day of ~~September~~ 2008.

CHERYL L. DANKERS

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